ounce troy. This is equivalent to 205·3 milligrams. The carat is an extremely ancient weight, of uncertain origin so far as its present value is concerned, but it would appear to be in some way connected with the old standard of fineness for silver in England, viz., 10 oz. 2 dwt. of fine silver to the pound troy, this ratio of fineness being equivalent to the quotient of 64 grains by 24 carats.

In conclusion, it is pleasing to note the moderate tone and invariable accuracy of statement which characterise this report of Dr. Guillaume on a subject which is often discussed in print with considerable warmth.

NOTES.

A COMMITTEE has been appointed for the purpose of erecting a monument to Marcelin Berthelot by means of an international subscription. The president of the committee is M. Loubet, who is to be assisted, we learn from the *Revue scientifique*, by MM. Gaston Boissier, Léon Bourgeois, Darboux, and Levasseur. Donations may be sent to M. Ch. Goudchaux, 16 rue Miromesnil.

PROF. R. A. S. REDMAYNE, professor of mining in the University of Birmingham, has been appointed an Inspector of Mines, under the Coal Mines Regulation Acts, 1887 to 1905, the Metalliferous Mines Regulation Acts, 1872 and 1875, and the Quarries Act, 1894, under the title of " Chief Inspector of Mines."

THE death is announced, in his seventy-first year, of Prof. Leopold Schrötter von Kristelli, professor of internal medicine in the University of Vienna, and distinguished for his work in the science of laryngology.

THE management of the Municipal Exhibition, which will be opened at the Agricultural Hall on May 1, has arranged for an installation of Röntgen-ray apparatus in a special building in the hall, and for demonstrations, illustrating its use, to be carried out at certain hours each day.

WE learn from the *British Medical Journal* that the Riberi prize, of the value of 800*l.*, which is given every five years by the Royal Academy of Medicine of Turin, has been awarded to Prof. Bartolomeo Gosio, director of the Laboratories of Public Health of the Italian Ministry of the Interior, for his studies on the bio-reaction of arsenic, selenium, and tellurium.

A BILL has been passed by the Virginia Legislature establishing a Virginia State Geological Survey. According to *Science*, the bureau is to have its headquarters at the University of Virginia, and the board is to be composed of the Governor (*ex officio*), the president of the University, the president of the Virginia Polytechnic Institute, and two citizens. An annual appropriation of 2000*l.* is provided

AN interesting exhibit of photographs, instruments, and other astronomical objects is now on view at Cardiff Museum. It was arranged by the Astronomical Society of Wales, and was opened by the Lord Mayor of Cardiff on April 23. Much interest is being taken in the exhibition, which will remain open for some weeks. The Cardiff City Council is now taking a commendable interest in the furtherance of popular astronomy, maintaining an observatory at Penylan Hill, which houses a 12-inch reflector. This observatory is also a meteorological station of the second class.

AN appeal is being made for subscriptions to a fund for the widow and daughters of the late Mr. Gerald Massey, whose literary works on subjects relating to myth, religion, and Egyptology are known to many readers and widely admired. A donation of 200*l.* has been received from the Royal Bounty Fund, and friends of the family have felt that this sum might form the nucleus of a fund which would yield a small income. Subscriptions will be received by Mr. James Robertson, 5 Granby Terrace, Hillhead, Glasgow, Scotland, who will render an account to all senders.

A CORRESPONDENT asks for information or references in regard to the deviation of rivers caused by the rotational velocity of the earth. Prof. G. A. J. Cole has kindly sent the following answer to the inquiry :—" The effect of the earth's rotation on the courses of rivers is regarded by many geographers as distinctly noticeable. The deflection is to the right in the northern hemisphere, the bank being, it is said, typically excavated on this side, while a shoal is left upon the other. In any series of meanders, therefore, those directed to the right side should tend to become more pronounced than those directed to the left. The reverse effects should occur in the southern hemisphere, the left bank being here eroded. Babinet and E. von Baer developed this theory in 1859 and 1860 respectively. The matter is discussed by G. K. Gilbert, *American Journal of Science*, vol. xxvii. (1884), pp. 427–32, and A. C. Baines, *ibid.*, vol. xxviii., pp. 434–6, and excellently and fully by A. Penck, ' Morphologie der Erdoberfläche ' (1894), vol. i., pp. 351–60, with numerous references and examples; a sketch is also given by I. C. Russell, ' Rivers of North America,' Progressive Science Series (1898), pp. 39–43. F. Wahnschaffe, who has to deal with the great rivers moving in loose materials over the Prussian plain, throws doubt, like some other writers, upon the efficacy of the earth's rotation in producing a noticeable divergence by erosion (' Die Ursachen der Oberflächengestaltung des norddeutschen Flachlandes,' 1901, p. 188)."

THE general type of weather was very wintry and unsettled during the past week, and at many places in the northern portion of the kingdom a lower minimum temperature has occurred than has been previously recorded in April for about forty years, the shade readings ranging from 18° to 22°. Much snow has also fallen in all parts of the country. The report of the weather issued by the Meteorological Office for the week ending April 25 shows exceptional conditions for the time of year. The mean temperature had a deficit of 10° in the east of Scotland and in the Midland counties, and of about 9° in many other parts of the kingdom. The absolute minima were generally registered on April 24 or 25. At Balmoral the sheltered thermometer fell to 10° on April 24, whilst on the grass the reading was as low as 4°. On April 25 the highest reading throughout the day was 35°, at Oxford, and 34°, at Cullompton and Buxton. Nearly all the precipitation took the form of sleet or snow, and the fall was exceptionally heavy in the east and south of England. At Oxford the gauge yielded 1·66 inches for the twenty-four hours ending 8 a.m. on Sunday, the depth of snow being 16 inches, whilst at Southampton the depth was 14 inches, and at Marlborough 11 inches. At Bournemouth the snow which fell for twelve hours during Friday night yielded 1·13 inches of water, equal to about 11 inches of snow. The snowstorm on our south coast on Saturday, April 25, has been characterised as a blizzard.

WE welcome the formation of the Research Defence Society, the object of which is to make known the facts as to experiments on animals in this country. The society was formed in January last, and already numbers more than 800 members. It is not an association of men of science or of medical men alone; its membership has been drawn from all departments of public life. Lord Cromer is the president, and a long list of vice-presidents includes the names of men distinguished in most branches of intellectual activity. The annual subscription is 5*s*., to cover working expenses, but larger subscriptions or donations will be gladly received. The acting honorary treasurer, *pro tem.*, is Mr. J. Luard Pattisson, C.B., of the Lister Institute, and an account in the society's name has been opened with Messrs. Coutts and Co., 440 Strand. The honorary secretary is Mr. Stephen Paget, 70 Harley Street, London, W., to whom all communications should be addressed. Lord Cromer, in a letter which has been widely circulated in the Press, directs attention to the immense importance to the welfare of mankind of experiments on animals conducted with proper care, and instances, among many results which have already followed such investigations, the use of antiseptics, the modern treatment of wounds, the invention of diphtheria antitoxin, and the discovery of the causes of plague, cholera, typhoid fever, and sleeping sickness. He also explains that the society will endeavour to make it clear that scientific men who perform experiments on animals are not less humane than the rest of their countrymen who daily, though perhaps unconsciously, profit by them. It is proposed to give information to all inquirers, to publish *précis*, articles, and leaflets, to make arrangements for lectures, and to assist all who desire to examine the arguments on behalf of experiments on animals.

The structure of the epidermis and epidermal glands of poisonous fishes forms the subject of an article by Mr. E. Pawlowsky in Nos. 7 and 8 of the *Comptes rendus de la Soc. Imp. Nat. de St. Pétersbourg* for 1907. In addition to the ordinary epidermal glands, poisonous fishes like the weavers (Trachinus) are furnished with large serous glands of a horny structure which secrete the harmful fluid. The sting-rays (Trygon) have, however, a numerous series of minute poison-glands in the tail.

Recent papers received from America include an elaborate account of the early stages in the development of the Mississippi alligator, by Prof. A. M. Riese, issued in vol. li. of Smithsonian Miscellaneous Contributions, and illustrated with twenty-three plates. Also notes on Guatemala birds, by Mr. N. Dearborn, and on fishes from Mexico and Central America, by Mr. S. E. Meath, published by the Field Museum of Natural History. Schizopod crustaceans from Alaska form the subject of a paper by Mr. A. E. Ortmann, published as No. 1591 of the Proceedings of the U.S. National Museum; while in No. 1594 of the same, Mr. A. S. Pearse describes four new species of the amphipod group from the Gulf of Mexico, and in No. 1593 Miss Richardson records the occurrence of the parasitic isopod Leidya on an entirely new host.

The first part of vol. vi. of the Annals of the South African Museum is devoted to a fourth instalment of the Rev. T. R. R. Stebbing's account of South African crustaceans, of which the earlier parts were published in "Marine Investigations in South Africa." In the present part the author describes as new seven species and one genus, but he takes occasion to point out that the most interesting results of his investigations are not so much novelty of characters in the new forms as the relationship between these South African types and others long known from remote parts of the globe. As an instance of this, it is mentioned that the description of the new Cape prawn, *Leontocaris paulsoni*, had only been published a few months when the discovery of a second species of the same specialised genus was announced in deep water off the Irish coast. The paper is illustrated by fourteen plates.

From the morphological standpoint, the rodent mammals form an exceedingly compact and uniform group. From the occurrence of the phenomenon known as inversion it has been suggested, however, that, developmentally, the murine section (Myomorpha) should be associated with the Subungulata, while the squirrel and hare groups (Sciuromorpha and Lagomorpha), in which inversion is absent, should constitute a section or order apart. On the other hand, it has been asserted that inversion, although most developed in the Myomorpha and Subungulata, does also occur in the other two groups, and the suggestion has been made that all rodents agree in their early developmental stages, although divergence takes place later. To test this, Mr. A. Ochs, of Düsseldorf, has undertaken an investigation of the intra-uterine development of the hamster, the results of which are published in vol. lxxxix., part ii., of the *Zeitschrift für wissenschaftliche Zoologie.* The conclusions with regard to the classification of rodents are, however, deferred.

One of the latest additions to the admirable series of "Guide-books" issued by the natural history branch of the British Museum is devoted to the elephant group, and explains in precise and yet popular language the wonderful story of proboscidean evolution revealed by recent discoveries in Egypt. The publication of such a guide-book was rendered practically imperative owing to the fact that the collection of proboscidean remains in the museum is more extensive than any other in the world. So large and so nearly complete is the collection that it is possible for the visitor to see with his own eyes practically every link in the chain between the primitive Egyptian Mœritherium, on the one hand, and the highly specialised Indian elephant and mammoth on the other. In the case of several of the early forms, complete models of the skull have been recently installed in the geological department. The interest of the series would be greatly increased if a life-sized model of the head of the long-chinned, four-tusked mastodon (*Tetrabelodon angustidens*) were prepared and placed alongside the heads of modern elephants. The guide, which is admirably illustrated, has been prepared by Dr. C. W. Andrews, the great authority on the group.

A pamphlet on the preparation and use of anti-plague vaccine has been issued by the Bombay Bacteriological Laboratory. It gives details of the preparation of the vaccine, and full directions as to the mode of inoculation. Another pamphlet on the same subject, "The Cause and Prevention of the Spread of Plague in India," a lecture delivered by Captain Glen Liston, summarises in a complete and interesting manner our knowledge of the parts played by the rat and flea in the dissemination of plague.

The first part has reached us of a new publication, *Parasitology*, a supplement to the *Journal of Hygiene*, edited by Prof. Nuttall, F.R.S., and Mr. A. E. Shipley, F.R.S. *Parasitology* will include papers dealing with the anatomy of mosquitoes, fleas, protozoa, and other parasites, which have only an indirect relation to hygiene and preventive medicine. The present part is devoted to a paper by Dr. Karl Jordan and the Hon. N. C. Rothschild on a revision of the non-combed, eyed Siphonaptera, a group of fleas to which that carrying plague belongs.

The March number of the Journal of the Royal Sanitary Institute (xxix., No. 2) contains an important paper by Dr. Rideal on the relative hygienic values of gas and electric lighting. The principal conclusions are that, owing to the better ventilation obtained by gas, the products of combustion are not present in the air in anything like the proportion that might be expected, the temperature and humidity in an occupied room being no greater than when the room is lighted with electric light; that carbonic acid has not the injurious effects formerly attributed to it; and that products—heat, carbonic acid, and moisture—are derived from the inmates more than from the illuminant.

THE work of improving the sugar-cane is still going on at Barbadoes, and the results obtained during the season 1905–7 are recorded in a publication recently issued by the Imperial Department of Agriculture for the West Indies. One of the new canes yielded as much as 2000 pounds of saccharose per acre more than was obtained from the ordinary White Transparent; it is obvious that differences of this kind are of prime importance to the sugar planter. Manurial experiments are also recorded; these are intended to find profitable combinations of manures. One result is rather interesting; nitrate of soda gave a larger yield of sugar than sulphate of ammonia, although the latter is commonly preferred in the West Indies.

IN the *Indian Forester* (February) prominence is given to an article by Prof. M. Henry on forests and rainfall. A theoretical discussion of the argument that the atmosphere contains more moisture in the neighbourhood of forests is clinched by the observation of an officer of engineers that a balloon will descend when passing over an extensive wooded area. It is also indicated how forests increase the rainfall of a locality and help to augment the supply of water from springs. A native apparatus for distilling camphor oil from the leaves of *Cinnamomum Tamala* is illustrated by Mr. B. Gopaliah.

THE sixth number of the Quarterly Journal of the Liverpool Institute of Commercial Research in the Tropics (January) has been received. Dr. E. Drabble contributes several short articles on West African oil seeds, dealing with *Carapa procera, Poga oleosa, Irvingia gabonensis,* the source of Dika butter, and *Scyphocephalium Kombo*; also a comparison of the barks of the red (*Rhizophora mangle*) and the white mangroves (*Laguncularia racemosa*) from the same region. Mr. R. Newstead furnishes the identifications and descriptions of several coccids infesting plants in Madagascar, among them being the gum-lac insect, *Gascardia madagascariensis*, that is allied to Ceroplastes, but is very different from Tachardia, the Indian lac insect. In connection with analyses of latex from *Ficus Vogelii*, Dr. D. Spence directs attention to the high percentage of magnesium and chlorides contained, as compared with the latex of Hevea or Funtumia, in which phosphates are largely present, while chlorides are almost absent.

A SECOND paper dealing with the fern genus Nephrodium is communicated by Mr. S. Yamanouchi to the March number of the *Botanical Gazette*. It is concerned with spermatogenesis, oogenesis, and fertilisation in the genus as exemplified in the species *Nephrodium molle*. The author obtained a very complete set of stages in the development of the spermatozoid. Blepharoplasts, arising in the cytoplasm, were observed in the sperm mother cell. The important modification of this body occurs in the sperm cell when it flattens out above the nucleus, becomes band-shaped, and finally wedge-shaped, with the narrow end joined to the nucleus. Thus the anterior part of the sperm is formed from the blepharoplast. The development of the ovum is normal; in fertilisation the sperm remains unchanged for a period after entering the egg nucleus, but eventually disintegrates with the formation of a reticular structure, and mixes with the egg nucleus.

BULLETIN No. 14 of the Edinburgh and East of Scotland College of Agriculture contains a detailed statement of the yield of milk and the percentage of fat therein obtained from a herd of twenty-seven cows. The fact that cows vary considerably in their milk yield is clearly brought out, and farmers are urged to keep systematic records of each cow's yield in order to improve the general standard by eliminating the poor ones.

No. 6 of the Memoirs of the Department of Agriculture in India deals with the movements of water in the soil. Perhaps no subject is of more importance to the agriculturist, or so little investigated in Great Britain and the British dependencies. Dr. Leather furnishes an interesting set of measurements which will prove of great value if they succeed in attracting some competent physicist to direct his attention to the numerous physical problems awaiting investigation in agricultural science.

THE February number of the *Agricultural Journal of the Cape of Good Hope* contains a report on the suitability of various South African fibre plants for paper-making Four materials are discussed, matjesgoed fibre, palmiet fibre, papkuil fibre, and bamboo; samples of the first three sent over to the South African Products Exhibition in London yielded pulp valued at 6*l.* or 7*l.* per ton, whilst bamboo pulp is valued at 9*l.* to 10*l.* In view of the abundance of fibre material in Cape Colony for which no use at present exists, the possibility of preparing pulp on the spot, and either exporting it or making it into paper, seems worthy of very careful consideration.

A NEW national forest, named the Verde, and consisting of 721,780 acres, has just been created, says the *Scientific American*, in Maricopa and Yavapai counties, Arizona. The forest lies on the west side of the Verde River, and constitutes a great part of its watershed. Most of the reserve is covered with brush that has no commercial value, but a small part has merchantable timber on it. The protection of the brush-grown area is just as important as that of heavily forested land, the scrub being the only thing that conserves the water and saves the watershed of the Verde River from erosion.

IN the *Mitteilungen* from German protectorates (vol. xxi., part i.), Dr. P. Heidke continues the discussion of meteorological observations made at Windhuk (South-West Africa) for the year ending June, 1906, commenced in the previous volume of this publication, dealing with the daily range of air-pressure and temperature and with their harmonic constituents. The effect of the continental climate is well shown in the small night minimum and evening maximum of pressure, as compared with the large morning maximum and afternoon minimum. The same number contains a valuable compilation, also by Dr. Heidke, of the monthly and yearly results, together with harmonic constituents, for twenty-five stations in the East African Protectorate, for the years 1903–4, deduced from tri-daily observations. References are also given to the periodicals in which the observations for previous years are published.

IT is stated in *Engineering* of April 24 that H.M.S. *Tartar*, the turbine topedo-boat destroyer, has satisfactorily undergone a very severe series of trials, and has been taken into commission. The *Tartar* is the fastest warship afloat, its speed on the official trials being 35·672 knots as a mean of six runs. During six hours' run the mean speed proved to be 35·363 knots, while the fastest run was at the rate of more than 37 knots. The speed guaranteed by contract was 33 knots. The vessel is 270 feet long, the propelling machinery being Parsons turbines and six Thornycroft water-tube boilers.

THERE has been much controversy in recent years on the subject of that class of Palæolithic stone implements which have been called eoliths. The question has now been taken up in the April number of *Man* by Mr. Worthington Smith, who deals specially with discoveries in the North Herts and South Beds plateaux, and in particular with the contorted drift, which contains all the varieties of worked stones which were lying on its surface at the time of its deposition, including older and newer palæoliths and their ever-accompanying eoliths. The last class he thus attempts to define :—" At the present day all kinds of oddities in flint are passed off as ' eoliths '; one author says the examples must be bulbless; another describes well-formed bulbs. One says the secondary flaking is vertical; another that it is lateral. Sometimes a proof of authenticity is said to rest on the fact that the stones in question present no flaking at all, only rubbing. If museums are visited one sees ordinary palæoliths masquerading as ' eoliths,' and rubbing shoulders with minor well-known Palæolithic forms, iron-stained neoliths, surface flints, and late Victorian oddities of all sorts." In short, Mr. Smith concludes that there are no such things as " eoliths " at all, nine out of ten of the thousands sent to him for examination being only natural flint fragments. " The tenth has been a minor and well-known Palæolithic form, or, it may be, a bulbed, iron-stained, Victorian flake, knocked off by the hoof of a farm animal." None of those he has examined he believes to be as old as the Boulder Clay.

IN a recently issued pamphlet (" Plato or Protagoras? " London: Simpkin, Marshall and Co., price 1*s.* net) Dr. F. C. S. Schiller propounds a novel and interesting view of the real significance of the speech attributed to Protagoras in Plato's dialogue, " Theaetetus." According to this view, the argument of the speech was not invented by Plato, but represents an attempt on his part to state fairly the actual case of an opponent whom he had not completely understood, and who had at the time of the composition of the dialogue passed beyond the reach of interrogation. Dr. Schiller seeks to justify his interpretation by maintaining that the criticisms which are directed by " Socrates " against the Sophist's arguments do not really refute them, and, in fact, prove merely that Plato had formed a very imperfect conception of their meaning and scope. Incidentally, Dr. Schiller takes occasion to claim that Protagoras was in all essential points an early exponent of his own doctrine of humanism, and that Plato's failure to refute him was prophetic of the superiority of the pragmatic philosophy over all forms of " intellectualism."

THE *American Journal of Science* for April contains an article by Mr. H. M. Dadourian, of Yale, on the constituents of atmospheric radio-activity at New Haven. Mr. Dadourian suspended a negatively charged wire for three hours in a cavity in the ground, and another for four days in the air about 7 metres above the ground. On determining the rate of decay of the radio-activity of each wire, he found that 5 per cent. of the initial radio-activity of the first, and 20 per cent. to 30 per cent. of that of the second, was due to thorium and its products, the rest to radium and its products. From this he deduces that the amount of radium emanation present in the air of New Haven is about 40,000 times as great as the amount of thorium emanation.

THE Adamson lecture, founded in 1903 in memory of the late Prof. Robert Adamson, of Manchester, was delivered last term by Prof. J. J. Thomson, and has recently been published by the Manchester University Press. It deals with the relation between ether and matter brought to light by recent electrical investigations. Prof. Thomson points out that in electrical phenomena we are brought into contact with cases of interaction between bodies charged with electricity, in which the action of the first on the second is not equal and opposite to the reaction of the second on the first. In such cases we suppose that both bodies are connected with the ether around them, and that Newton's third law holds when we consider the ether and the two bodies as constituting the system under examination. From this point of view, the potential energy of an electrical system may be regarded as due to its connection with an invisible subsidiary system possessing kinetic energy equal in amount to the potential energy of the original system. This conception may be further extended to non-electrified bodies, and the ether thus comes to play an important part in ordinary dynamics.

PROF. ANDREW GRAY delivered an oration on Lord Kelvin at the University of Glasgow on Commemoration Day, April 22. The address dealt largely with the early work of the great master at Glasgow, when he was making the electrodynamic and electromagnetic theories more explicit, and testing them experimentally under conditions the antithesis of those which exist in the well-equipped laboratories of the present day. Prof. Gray mentions two views held by Lord Kelvin to which we may at the present time well devote special attention. He believed that the study of natural philosophy ought not to be excluded from the arts curriculum, and he was strongly opposed to the tendency which has been manifesting itself to separate the experimental from the mathematical side of physical work. With him the mathematical symbol was merely the servant of the idea, and mathematical methods had their place among the tools and instruments of research. The printed copy of the oration contains portraits of Lord Kelvin in 1846, 1868, and 1905 respectively, and a view of the outside of the natural philosophy rooms of the old college buildings.

PROF. P. ZEEMAN, in his second note on the magnetic resolution of spectral lines and magnetic force (*Konink. Akad. Wetens. Amsterdam*, December 24, 1907), gives some striking measurements of asymmetric separation, with excellent photographic reproductions illustrating the various stages. By means of the method of the non-uniform magnetic field, described in the first article in the above Proceedings for April, 1907, he finds it possible to study at a glance any series of phenomena dependent on the field intensity for a series of different intensities. The class of asymmetric separations herein considered has been predicted from theory by Voigt, and has also been considered by Lorentz. One of the most interesting cases is the yellow mercury line at λ 5791, the structure of which cannot be satisfactorily made out by the interferometer. The first-order spectrum of a Rowland concave grating of 6·5 metres radius, with 10,000 lines to the inch, has been employed for the investigation. It is seen that while the 5791 line is resolved asymmetrically, the neighbouring line, 5770, is resolved into a perfectly symmetrical triplet. Of this pair of lines a nine-fold enlargement of the original negative is given, showing most distinctly the above effect. The intensity of the magnetic fields employed varied from 14,800 to 29,220 Gaussian units. There are several points requiring further investigation; the apparent inconstancy of the amount of asymmetry contrary to theory, also the apparent asymmetric intensities observed in the components of various lines. Careful measurements of the width of the lines show that the mean value is about 0·07 Ångström unit, and that the asymmetry amounts to about half this amount.

Sir William Ramsay contributes to the May number of *Cassell's Magazine* a popular article under the title "How Discoveries are made," in which he refers, among other matters, to the work of Priestley, Scheele, and Cavendish on air and combustion; Crookes, Lenard, and Röntgen on kathode rays; and Soddy and himself on radium emanation and its decomposition into helium, leading up to a short statement as to β rays and the corpuscular theory of electricity. The article provides general readers with a glimpse of scientific work, and is a welcome feature in a popular magazine.

The Institute of Chemistry has published a second edition of the "List of Official Chemical Appointments." It has been compiled by direction of the council of the institute, and under the supervision of the proceedings committee, by Mr. Richard B. Pilcher, registrar and secretary of the institute. The scheme adopted in the first edition has been adhered to, the information has been corrected carefully, and numerous additions, including an index of names, have been made. The list is arranged in two main divisions; the first contains appointments in the British Isles, and the second in India, Canada, Australia, British colonies and protectorates, Egypt, and the Sudan provinces. The appointments dealt with include those under State departments, local authorities, and public institutions, in addition to teaching posts at universities, colleges, and schools. An appendix gives concise information as to societies for the advancement of chemical science and of professional chemical interests. The publication, the price of which is 2*s*. net, should prove of great service to all who are interested in the applications of chemistry to State purposes and in the teaching of the science at its various stages.

OUR ASTRONOMICAL COLUMN.

Astronomical Occurrences in May:—

May 1. 8h. 46m. to 12h. 28m. Transit of Jupiter's Sat. III. (Ganymede).
3. 21h. 59m. Venus in conjunction with the Moon. Venus 4° 15′ N.
4. 8h. 48m. to 9h. 46m. Moon occults μ Geminorum (mag. 3·2).
5. 0h. 51m. Neptune in conjunction with the Moon. Neptune 1° 20′ S.
6. 22h. 41m. Jupiter in conjunction with the Moon. Jupiter 1° 47′ S.
7. 10h. 56m. Minimum of Algol (β Persei).
15. Venus. Illuminated portion of disc = 0·388.
,, 8h. 42m. to 13h. 31m. Transit of Jupiter's Sat. IV. (Callisto).
16. 11h. 15m. to 12h. 22m. Moon occults ψ Ophiuchi (mag. 4·6).
19. 8h. 34m. Uranus in conjunction with the Moon. Uranus 0°. 35′ N.
24. 23h. 47m. Saturn in conjunction with the Moon. Saturn 3° 15′ N.
29. Venus at maximum brilliancy.
30. 9h. 25m. Minimum of Algol (β Persei).
31. 13h. 52m. Mercury in conjunction with the Moon. Mercury 2° 19′ N.

A New Star-finder.—The "Metron" star-finder submitted to our examination by the maker, Mr. C. Baker, 244 High Holborn, is an ingeniously designed instrument which will enable beginners in astronomy to become practically acquainted with the constellations and the brighter stars, and also with the more important problems usually placed under the heading "The Use of the Globes." It consists of a 4-inch celestial globe mounted on a tripod and stand so that it may be erected for any latitude. A date circle and a loose hour circle round the south pole enable the user to set the globe for any day and hour of the year. There is also a wire grip carrying a circle, with a pointer at its centre, and a pair of telescopic sights. Having set the globe for latitude, oriented it north and south by the fixed compass, and levelled the stand by means of the two bubbles set in it, the user sets the hour circle according to the directions, and places the pointer over the star, on the globe, which he wishes to locate and recognise; the real star may then be seen in the centre of the telescope field. In this way a number of constellations and important stars, of which the names are given on the globe, may be recognised. Conversely, knowing the date and the position of the star, the approximate time may be determined; special sights are supplied for work on the sun. To facilitate the reading of the globe and circles when working at night, a small electric lamp—and dry cell—is fitted to the stand.

The whole apparatus is nicely finished in nickel plate, and should prove useful in demonstrating problems in astronomy to beginners. For anything like accurate work, the apparatus in its present form and size is, we believe, on too small a scale; a very small error in the setting produces great confusion when magnified on the celestial vault, and the unaided beginner would probably find that his knowledge of the constellations was not considerably enlarged; when he began to be familiar with the instrument and the stars he would find in the combination a source of many hours of interesting work and problem-solving. Spare globes, covered with blank paper, may be obtained for the purpose of plotting the apparent paths of planets, &c.; on the present globe we notice one or two misspellings, *e.g.* Sygnus, Delphin, as the names of constellations. The price of the instrument, complete in box, is 2*l*. 12*s*. 6*d*.

Saturn's Rings.—In No. 4243 of the *Astronomische Nachrichten*, pp. 289 to 313 are devoted to records and discussions of observations of Saturn made by various observers during the end of 1907 and the beginning of the present year. Prof. Lowell and Mr. Lampland give the details of the Flagstaff observations, and the former discusses the appearance of the edge of the ring system and of the condensations remarked by Prof. Barnard, themselves, and other observers. When observing the shadow of the rings on the ball of the planet, all the Flagstaff observers noticed that it was traversed by a medial core the blackness of which was far more intense than that of the boundaries. This core was first observed on June 19, 1907, and was plainly visible on subsequent occasions; on November 5 the shadow generally was of a faint cherry-red tinge, and the black medial line was slightly undulatory, showing irregularities of outline. Drawing conclusions from the discussion of his results, Prof. Lowell finds that the rings approach more nearly to the body of the planet than hitherto measured, and that the middle and inner members of the ring systems are not flat rings, but tores; this would account for the condensations observed, and for the medial core of the shadow.

The Systematic Motions of the Stars.—From the analytical study of the motions of 1100 stars having proper motions of between 20″ to 80″ per century, and distributed over both hemispheres, Prof. Dyson has obtained results which confirm those previously obtained by Kapteyn and Eddington, viz. that the stars are moving in two streams.

The positions found for the apices of the two streams as found by the different observers are shown below:—

	Stream I.		Stream II.	
Kapteyn ...	R.A. 85°,	Dec. −11° ...	R.A. 260°,	Dec. −48°
Eddington ...	,, 90°,	,, −19° ...	,, 292°,	,, −58°
Dyson	,, 94°,	,, −7° ..	,, 240°,	,, −74°

The quick-moving stars considered in the latest discussion show the two distinct drifts very pronouncedly, particularly in the case of Stream II. For Stream I. the